

CLAIMS

1. An optical device comprises:

a plurality of optical modulator units having liquid-crystal panels and exit polarizer plates arranged by heat insulation on the liquid-crystal panels; and

a color-combining optical unit for combining parts of light modulated by the plurality of optical modulator units;

characterized in that the exit polarizer plates of the plurality of optical modulator units each are separated in an optical axis direction, to have two exit polarizer plates of a first exit polarizer plate arranged at an exit side and a second exit polarizer plate arranged at an incident side.

2. The optical device as claimed in claim 1, characterized in that the first exit polarizer plate and the second exit polarizer plate are arranged thermally insulated from each other.

3. The optical device as claimed in claim 2, characterized in that the color-combining optical unit is bonded with a first heat conductor plate on each incident surface thereof and bonded with the first exit polarizer plate on the first heat conductor plate, and attached with heat-insulation pins projecting toward the liquid-

crystal panel,

wherein, on the heat-insulation pins, a polarizer-plate holding frame for holding a second heat conductor plate bonded with the second exit polarizer plate and a liquid-crystal panel holding frame holding the liquid-crystal panel are mutually fixed with a predetermined spacing.

4. The optical device as claimed in claim 1, characterized in that the first exit polarizer plate and the second exit polarizer plate are thermally connected.

5. The optical device as claimed in claim 4, characterized in that the color-combining optical unit is bonded with a first heat conductor plate on each incident surface thereof and bonded with the first exit polarizer plate on the first heat conductor plate, and attached with a polarizer-plate holding frame holding a second heat conductor plate bonded with the second exit polarizer plate,

wherein the first heat conductor plate or the polarizer-plate holding frame is attached with heat-insulation pins projecting toward the liquid-crystal panel,

a liquid-crystal panel holding frame holding the liquid-crystal panel being fixed on the heat-insulation pins.

6. The optical device as claimed in any of claims 1 through 5, characterized in that the first heat conductor plate is thermally connected to a heat conductive block adjacently connected to the color-combining optical unit, the liquid-crystal panel holding frame being thermally joined to an optical component housing supporting the optical unit.

7. The optical device as claimed in claim 3 or 5, characterized in that the plurality of polarizer-plate holding frames are thermally connected with each other.

8. The optical device as claimed in claim 7, characterized in that the plurality of polarizer-plate holding frames are thermally connected by heat conductive rubber.

9. The optical device as claimed in claim 7, characterized in that the plurality of polarizer-plate holding frames are thermally connected by heat conductive layers adhered to mutually adjacent two of the polarizer-plate holding frames and heat conductive members interposed between the heat conductive layers.

10. The optical device as claimed in any of claims 1 through 9, characterized in that the second exit polarizer plate has a cross transmissivity set at a transmissivity greater than 50% of a total transmissivity.

11. The optical device as claimed in any of claims 1 through 10, characterized in that the first heat conductor plate is formed by a member higher in heat conductivity than the second heat conductor plate.

12. An optical device having, plurality in set, an optical modulator unit having a liquid-crystal panel and an exit polarizer plate arranged by heat insulation on the liquid-crystal panel, the optical device characterized in that:

the optical modulator unit to be passed by a greatest intensity of light among the plurality of optical modulator units comprises two exit polarizer plates which the exit polarizer plates are arranged separately in an optical axis direction.

13. A projector comprising:

an illumination device for emitting illumination light;

a color-separation optical system for separating illumination light emitted from the illumination device into a plurality of color lights; and

a plurality of optical devices for modulating color lights separated by the color-separation optical system and forming an image, the projector characterized in that:

the optical device is the optical device as claimed

in any of claims 1 through 12.